Oncology Pain and Complementary Therapy: A Review of the Literature

Alice Running, PhD, RN, APN, and Elizabeth Turnbeaugh, MS, RN, APN

Half of all patients with cancer experience some level of pain, so pain management is an important topic for oncology nurses. Pharmacologic measures traditionally are the primary intervention for bone, visceral, neuropathic, and procedural pain; however, many patients are turning to an integrative approach of Western and complementary therapies for pain and symptom management. The authors explored the current evidence concerning the effectiveness of complementary therapies in relation to cancer pain and symptom control.

Most patients with cancer experience pain at some time during their cancer experience. Seventy-five to 90% of all patients with advanced cancer experience pain, and 50% of those describe their pain as moderate to severe (National Pain Foundation, 2009). Although many guidelines are available for clinicians and patients, cancer-related pain continues to be undertreated (Lorenz et al., 2006). Barriers to effective pain management exist among nurses and patients with cancer (National Cancer Institute [NCI], 2009). For nurses, limitations to effective pain management include a lack of (a) appropriate assessment skills, (b) knowledge about effective intervention strategies, (c) information related to controlled substance abuse, and (d) understanding about patients becoming tolerant to analgesics (NCI, 2009). For patients, barriers in pain management include a reluctance to report pain, worries that pain is a sign of worsening disease, and a fear of addiction (NCI, 2009).

Uncontrolled pain can lead to physical and psychological distress. Cancer-related pain results from interruption of bone, visceral, and neural structures because of direct tumor involvement or metastases, treatment effects (e.g., diagnostic procedures, surgery, radiation therapy, chemotherapy), or a combination (Gatlin & Schulmeister, 2007; Shaiova, 2006) (see Table 1). These types of pain often are relieved by a combination of pharmacologic and nonpharmacologic interventions. Although medication is one means of therapy for pain relief, many patients with cancer have turned to alternative modalities to assist them with their physical, emotional, and spiritual well-being. Oncology nurses play an important role in educating and informing patients regarding nonpharmacologic measures that may be employed for pain management. Complementary therapies (CTs) can help relieve pain and improve quality of life. The purpose of this review is to provide oncology nurses with information about the evidence related to several CT intervention strategies that can be used in addition to traditional medical treatments to alleviate or arrest cancer pain.

CTs, as defined by the National Center for Complementary and Alternative Medicine (2009), are a group of diverse medical and healthcare systems, practices, and products that are not presently considered to be part of conventional medicine. Specific types of CT include but are not limited to massage therapy, acupuncture, hypnosis, healing touch, therapeutic touch, reflexology, and meditation. According to the National Health Interview Survey, about 38% of all American adults use some type of complementary and alternative medicine and they spent about $34 billion on related products and practitioners over the prior 12 months (Barnes,
Table 1. Characteristics of Pain by Type

<table>
<thead>
<tr>
<th>TYPE OF PAIN</th>
<th>CHARACTERISTICS</th>
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<tbody>
<tr>
<td>Bone</td>
<td>Focal, multifocal, or generalized deep throbbing with intermittent sharp intense pain; worsened with activity</td>
</tr>
<tr>
<td>Chronic lancinating or paroxysmal</td>
<td>Sharp, shooting, knifelike; often with sudden onset</td>
</tr>
<tr>
<td>Neuropathic</td>
<td>Continuous dysesthesia: continuous burning, electrical sensations, or other abnormal sensations</td>
</tr>
<tr>
<td>Visceral</td>
<td>Dull, deep squeezing that is poorly localized</td>
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Note. Based on information from Chang et al., 2006; Lee & Washington, 2008; Miller et al., 2001; Shaiova, 2006.

Bloom, & Nahin, 2008). Oncology nurses have a responsibility to provide pain relief and symptom control, and could be instrumental in initiating and facilitating complementary and alternative interventions that are known to be beneficial for managing pain.

Complementary Therapy Modalities

Massage therapy involves methodical manual manipulation of muscles, tendons, ligaments, and fascia by rubbing, rolling, and kneading (Gatlin & Schulmeister, 2007). Several types of massage exist (e.g., Swedish, sports, deep tissue, reflexology, trigger point, neuromuscular therapy). It can alleviate pain by promoting relaxation of muscles, decrease lactic acid build-up, improve range of motion, and improve circulation and lymphatic drainage (Corbin, 2005; Gatlin & Schulmeister, 2007). Massage also has been found to increase natural killer cell production (Corbin, 2005). Acupuncture is a traditional Chinese technique of stimulating specific points on the body by needle (acupuncture), pressure (acupressure), electrical impulses (electroacupuncture), or laser (laser acupuncture) to relieve pain or other adverse symptoms (Cassileth & Deng, 2004; Standish, Kozak, & Congdon, 2008). The therapeutic effects of acupuncture are based on the traditional Chinese belief that a vital force (chi) runs throughout the body; symptoms such as pain, nausea, and vomiting are described as an obstruction in the circulation of chi (Standish et al., 2008). Treatment of those symptoms involves the breakdown of chi’s obstruction, which leads to improved circulation (Standish et al., 2008).

Healing touch is a biofield therapy that encompasses a group of noninvasive techniques that use the hands to clear, energize, and balance human and environmental energy fields (Healing Touch International, 2010). Therapeutic touch is another form of healing where the practitioner’s hands direct human energy (Jackson et al., 2008). Reiki is a Japanese technique for stress reduction and relaxation that also promotes healing. It is administered by “laying on hands” and is based on the idea that an unseen life force energy flows through us and causes us to be alive (International Center for Reiki Training, 2010; Jackson et al., 2008). Therapeutic touch, healing touch, and Reiki are types of touch energy and are based on the theory that the body, mind, and emotions combine to form a complex energy field (Jackson et al., 2008). Energy balance is interrupted during illness or injury, so the goal of therapy is to create a sense of equilibrium between the energy fields.

Mind-body therapies, such as hypnosis, meditation, biofeedback, and imagery, focus on the interaction between the brain and body. These interventions aim to help patients relax, reduce stress, and relieve symptoms associated with cancer and cancer treatments (Cassileth & Deng, 2004).

Safety

Massage therapy, acupuncture, touch therapies, and hypnosis generally are well tolerated. Common side effects seen in massage therapy are bruising, swelling, and a temporary increase in muscle pain (Corbin, 2005). Manipulative therapies and deep tissue massage are not suitable in patients with thrombocytopenia, coagulation disorder, those taking anticoagulation medications (e.g., warfarin, heparin, aspirin therapy), deep vein thrombosis, open wounds, and radiation dermatitis (Corbin, 2005; Mansky & Wallerstedt, 2006). Trotter (1999), Mikhail, Reidy, Taylor, and Soble (1997), and Kerr (1997) reported or theorized serious adverse events related to massage therapy, including fractures and dislocations, internal hemorrhage, hepatic hematoma, dislodging of deep vein thrombosis with resultant embolism of the renal artery, and displacement of a ureteral stent. The most frequent side effects of acupuncture consist of local bleeding, bruising, and mild pain (Mansky & Wallerstedt, 2006). Acupuncture is not advised in those with immune suppression, thrombocytopenia, bleeding disorders, anticoagulation therapy, or aplasia (Mansky & Wallerstedt, 2006). Mind-body techniques can be effective in treating psychological issues such as anxiety and mood disturbances, but can be harmful and worsen symptoms in patients with unstable psychiatric conditions (Gatlin & Schulmeister, 2007).

The current literature review examined prevalent types of pain described by patients with cancer and CTs known to be effective for those types of pain (see Table 2). All levels of evidence were considered. Levels of evidence are identified for each of the research studies and include meta-analysis (level 1), experimental design (randomized controlled) (level 2), well-designed quasiexperimental design (not randomized or no control group) (level 3), well-designed nonexperimental design (level 4), and case reports, clinical expertise, or expert opinion (level 5) (College of St. Scholastica, 2011). The search was conducted using the PubMed and CINAHL® databases, as well as the National Pain Foundation and National Cancer Institute Web sites. PubMed terms and free-text words used in each of the searches were related to common causes of pain for patients with cancer (e.g., bone, visceral, neuropathic). Each discussion of pain is followed by a review of CT modalities known to be beneficial.

Literature Review

Bone Pain

For patients with cancer, bone metastases are one of the most common causes of pain (Shaiova, 2006). Pain can be focal, multifocal, or generalized, with patients often experiencing deep powerful throbbing disrupted by sharper intense pain (Chang, Janjan, Jain, & Chau, 2006; Shaiova, 2006). The pain usually is associated with invasion of the tumor into the bone, often causing debilitation that is worsened by movement or weight-bearing activities (Chang et al., 2006; Shaiova, 2006). The most
common tumors that metastasize to bone originate in the breast, lung, prostate, thyroid, and kidney (Shaiova, 2006).

In bone metastases, the cancer disrupts the balance between osteoblast and osteoclast activity, causing inflammatory, immunologic, and neuropathic mechanisms to develop (Chang et al., 2006; Shaiova, 2006). Bone mass and integrity diminish, making patients susceptible to skeletal complications (e.g., compressions, fractures, spinal instability), which may lead to increased levels of pain in those with metastatic disease (Shaiova, 2006).

Traditional pharmacologic modalities (e.g., nonsteroidal anti-inflammatory drugs, corticosteroids, bisphosphonates, opioids) are effective in pain management for bone metastases. However, pain is individualized and multidimensional and may not be fully resolved with these treatment measures. Evidence at levels 2, 3, and 4 demonstrate effectiveness in managing bone pain with CTs.

**Massage therapy:** In an experimental pretest and post-test randomized study (level 2), Stephenson et al. (2007) compared the effects of partner-delivered foot reflexology and usual care on patients’ perceived pain and anxiety. The patients in the experimental group received a 30-minute foot reflexology intervention from their partners, and patients in the control group received a 30-minute partner-delivered reading session. Partner-delivered reflexology resulted in an immediate effect in decreasing pain and anxiety in patients with metastases; however, the long-term effects were not evaluated. Kutner et al. (2008) evaluated the efficacy of massage therapy in the relief of pain, symptom distress, and improvement in quality of life in those with advanced cancer. In a randomized controlled trial of 380 participants (level 2), the authors concluded that improvement in pain and mood immediately after massage was greater than with simple touch alone (Kutner et al., 2008). The researchers reported that massage may offer immediate relief for patients with cancer pain; however, the study results illustrated a lack of sustained efforts (i.e., more than three weeks).

Jane, Wilkie, Gallucci, Beaton, and Huang (2009) studied the effects of full-body massage on pain intensity, anxiety, and physiologic relaxation over a 16- to 18-hour period in 30 Taiwanese patients with cancer with bone metastases (level 3). The quasiexperimental, one-group, pretest and post-test design found that massage therapy had effective immediate, short-term (20–30 minutes), intermediate (1–2.5 hours), and long-term (16–18 hours) benefits on present pain intensity and anxiety, with the most significant impact occurring 15–20 minutes postintervention.

Hughes, Ladas, Rooney, and Kelly (2008) performed an extensive literature review of more than 70 articles and found that massage therapy was a safe therapeutic intervention that is valid in managing side effects such as pain, depression, constipation, and high blood pressure. The researchers also discovered that massage may support immune function during periods of immunosuppression among pediatric patients with cancer.

Wilkinson, Barnes, and Storey (2008) completed a systematic review of 10 clinical trials with a total of 428 patients, assessing the effectiveness of massage in reducing physical and psychological

### Table 2. Research Evidence of Effective Complementary Therapies by Pain Type

<table>
<thead>
<tr>
<th>PAIN TYPE</th>
<th>LEVEL OF EVIDENCE</th>
<th>SYMPTOMS BENEFITED</th>
<th>RESULTS</th>
<th>POTENTIAL SIDE EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BONE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acupuncture</td>
<td>2 and 4; literature review</td>
<td>Pain and analgesic use</td>
<td>Short term</td>
<td>Local bleeding, bruising, and pain</td>
</tr>
<tr>
<td>Massage therapy</td>
<td>2 and 3; literature review</td>
<td>Pain, anxiety, depression, symptoms of constipation, blood pressure, immune function, and nausea</td>
<td>Short term; up to 16 hours</td>
<td>Bruising, swelling, and temporary muscle pain</td>
</tr>
<tr>
<td>Therapeutic touch</td>
<td>Literature review</td>
<td>Pain and anxiety</td>
<td>Sustained effects unknown</td>
<td>No adverse effects</td>
</tr>
<tr>
<td>VISCERAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acupuncture</td>
<td>2</td>
<td>Pain, increased function, and lower symptoms of xerostomia</td>
<td>Sustained effects unknown</td>
<td>No adverse effects</td>
</tr>
<tr>
<td>Massage therapy</td>
<td>2 and 3</td>
<td>Pain, blood pressure, respiratory rate, heart rate, total mood disturbance, anxiety, and nonsteroidal anti-inflammatory drug use</td>
<td>Short term</td>
<td>No adverse effects</td>
</tr>
<tr>
<td>NEUROPATHIC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acupuncture</td>
<td>2 and 4</td>
<td>Pain intensity, numbness, tingling, and analgesic use</td>
<td>Long term; 24–48 hours</td>
<td>No adverse effects</td>
</tr>
</tbody>
</table>

*Note.* Level 2 evidence is obtained from at least one well-designed randomized controlled trial. Level 3 evidence is obtained from well-designed controlled trials without randomization, quasiexperimental. Level 4 evidence is obtained from well-designed case-control and cohort studies. Level 5 evidence is obtained from systematic reviews of descriptive and qualitative studies.

*Note.* Based on information from Alimi et al., 2003; Cassileth & Vickers, 2004; Cepeda et al., 2006; College of St. Scholastica, 2011; Currin & Meister, 2008; Evans et al., 2008; Hughes et al., 2008; Jackson et al., 2008; Jane et al., 2009; Kutner et al., 2008; Lang et al., 2006; National Cancer Institute, 2009; Pfister et al., 2008; Post-White et al., 2003; Richardson et al., 2006; Standish et al., 2008; Stephenson et al., 2007; Wilkinson et al., 2008; Wong & Sagar, 2006; Zhang et al., 2007.
symptoms in patients with cancer. The results of the studies suggest that massage might reduce anxiety for the short term and may have a beneficial effect on physical symptoms, such as pain and nausea (Wilkinson et al., 2008). However, the lack of rigorous research evidence precludes drawing definitive conclusions.

Massage therapy provides effective pain relief in those with primary malignancies or metastatic disease affecting the bones; however, research is lacking regarding the length of treatment effects. Researchers should study the sustained effects of massage to gain more knowledge on the benefits of this therapy.

**Acupuncture:** Guo, Zhang, Gong, and Zhang (1995) carried out a large, randomized controlled trial of 286 patients with cancer who had bone metastases (level 2), which revealed that acupuncture was associated with decreased pain levels and a reduction in analgesic and sedative medications needed among 212 patients. Zhang et al. (2007) found that electroacupuncture alleviated bone cancer pain in male Copenhagen rats (level 4). Cancer was induced by injecting prostate cancer cells directly into the tibias of seven rats. The data suggest that electroacupuncture is effective in decreasing symptoms of bone pain, partly by suppressing interleukin-1β expression. Zhang et al. (2007) stated that interleukin-1β is upregulated during bone cancer pain, which is known to contribute to inflammatory pain hypersensitivity.

In a literature review by Standish et al. (2008), 23 of 27 randomized controlled clinical trials of acupuncture reported statistically significant symptom improvement in the group receiving acupuncture. Those findings suggest that acupuncture may have a role in decreasing bone pain, visceral pain, neuropathic pain, and other associated symptoms. Acupuncture has been proven to be therapeutic against pain; however, few studies focus specifically on bone pain. It would be valuable to conduct additional trials aimed at those patients with cancer experiencing bone pain only.

**Therapeutic touch:** In a literature review, Jackson et al. (2008) examined 12 studies evaluating the effectiveness of therapeutic touch in reducing pain and anxiety among patients with cancer. According to the analysis, therapeutic touch and other touch-energy therapies are effective in relieving physical and psychological symptoms (e.g., pain, anxiety) in patients with cancer.

Although energy therapies are becoming more widely known, limited research exists. Additional studies with more participants need to be reproduced to gather information on the sustained effects and symptom management. Overall, these modalities all are relevant for the treatment of bone pain in patients with cancer.

**Visceral Pain**

Visceral pain is caused by infiltration, compression, distention, or stretching of thoracic and/or abdominal organs by cancer (Lee & Washington, 2008; Shaiova, 2006). According to Chang et al. (2006), visceral pain is more frequent in patients with abdominal and pelvic tumors (e.g., prostate, stomach, ovarian, liver cancers).

Visceral pain commonly is described as dull, deep, and squeezing (Lee & Washington, 2008). Visceral pain rarely is localized and can be accompanied by nausea, fatigue, and diaphoresis (Shaiova, 2006). Primary tumor involvement or metastatic disease to an organ may cause varying referral patterns of pain and can occur remotely from the disease (Shaiova, 2006).

Visceral pain typically is responsive to treatment with opioids, the principal line of therapy. In those with inadequate relief or side effects from opioids, a celiac ganglion block or a splanchnic nerve block may be used in select cases. Other useful pharmacologic interventions include anticholinergics or those with anticholinergic properties, such as scopolamine (Miller, Miller, & Jolley, 2001). In combination with pharmacologic treatment, various CTs are therapeutic in the management of visceral pain, with evidence at levels 2 and 3.

**Massage therapy:** Currin and Meister (2008) assessed the impact of Swedish massage on the perceived levels of distress of patients with cancer, focusing on four areas (e.g., pain, physical discomfort, emotional discomfort, fatigue). The study was a nonrandomized, single-group pre- and post-test design (level 5) with 251 participants. The analysis revealed statistically significant reductions in patient-reported distress in each area.

Post-White et al. (2003) conducted a randomized two-period crossover of 230 participants (level 2) to test the effects of therapeutic massage and healing touch in comparison to nurse presence alone or standard care. The researchers found that massage therapy lowered blood pressure, respiratory rate, heart rate, total mood disturbance, and anxiety. Massage therapy also was effective in decreasing pain ratings and nonsteroidal anti-inflammatory drug use over a four-week period among patients with bone and visceral pain. Reduction of pain was short-term (i.e., four weeks or less) and the authors concluded that additional studies were warranted to study long-term effects of massage on cancer pain.

In a large outcome study by Cassileth and Vickers (2004) of 1,290 patients over a three-year period (level 3), massage therapy decreased symptom scores, including pain, by half. That evidence was conclusive, even for patients who had high baseline scores. Cassileth and Vickers (2004) found that Swedish massage and light-touch massage were superior to foot massage. Researchers also found that outpatients experienced persistent benefit over the 48 hours studied compared with inpatients. The authors related that difference to the setting where the massage took place and the fact that inpatients were subjected to invasive procedures.

**Acupuncture:** The preliminary results of a randomized controlled trial (level 2) by Pfister et al. (2008) showed significant reductions in pain, dysfunction, and xerostomia in patients receiving acupuncture compared to usual care. Seventy patients with head and neck cancers post-neck dissection were randomized between acupuncture and control groups. Although more research is needed, the data support the potential role of acupuncture in addressing post-neck dissection complications, including pain.

**Summary:** According to the literature review, massage therapy is effective not only in pain relief, but for other symptoms associated with cancer and cancer treatment. The research discussed was carried out in large clinical trials; however, two of the studies are dated. The preliminary results of a clinical trial showed promising results of acupuncture on visceral pain (Pfister et al., 2008).

More studies with a large number of participants need to be held to establish the effectiveness of acupuncture in managing visceral pain. Overall, massage, acupuncture, and therapeutic touch need additional study, but preliminary results suggest efficacy in massage and acupuncture for the treatment of visceral pain.

**Neuropathic Pain**

Neuropathic pain, unlike bone and visceral pain, does not rely on activation of the nociceptors; instead, it is a result of injury...
to the peripheral nerves, spinal cord, or brain tissue (Buttaro, Trybulski, Bailey, & Sandberg-Cook, 2008). Primary neoplasm or metastatic disease to bone or adjacent soft tissue causing compression, mechanical traction, inflammation, or infiltration of nerve trunks, plexus, and spinal roots can result in pain (Chang et al., 2006; Shaiova, 2006). All malignancies may lead to neuropathic pain, with specific causes comprising head and neck cancers resulting in cranial neuropathies, salivary gland tumors leading to facial neuropathy, breast and lung cancers leading to infiltration of the brachial plexus neuropathy, and metastatic prostate cancer causing lumbosacral plexopathies (Shaiova, 2006).

According to Miller et al. (2001), two distinct types of neuropathic pain exist. The first, continuous dysesthesia, is characterized by continuous burning, electrical sensations, or other abnormal sensations (Miller et al., 2001). The second type, chronic lancinating or paroxysmal pain, is described as a sharp, shooting, knifelike pain, often with a sudden onset.

Other causes of neuropathic pain may be directly related to cancer treatments (e.g., chemotherapy, radiation therapy, surgery). Exposure to chemotherapeutic drugs can damage nerves, resulting in debilitating neuropathies (Buttaro et al., 2008; Shaiova, 2006). Chemotherapy-induced peripheral neuropathy is common with taxanes, platinum analogs, and vinca alkaloids (Wong & Sagar, 2006). Symptoms of neurotoxicity can appear immediately, during, or after treatment, with severity depending on the type and cumulative dose of chemotherapy administered (Wong & Sagar, 2006). Chemotherapy-induced peripheral neuropathy symptoms can resolve completely, but they are at least partially irreversible in most patients (Wong & Sagar, 2006). Patients undergoing radiation treatment may develop postradiation plexopathies, which occur more frequently with high dosages or cumulative totals greater than 6,000 rad (Shaiova, 2006). Surgical procedures removing invasive or metastatic tumors also may lead to neuropathic pain if a disruption in nervous system pathways occurs.

Neuropathic pain can be a difficult syndrome to treat in patients with cancer. Pharmacologic treatment measures useful in the treatment of continuous dysesthesia-type pain include tricyclic antidepressants and systemic local anesthetics (Miller et al., 2001). Medications used in chronic lancinating or paroxysmal pain consist of anticonvulsants, gabapentin, opioids, and antidepresants (Miller et al., 2001). As evidenced in the literature, integrative medicine has been proven to help treat those affected by neuropathic pain at levels 2 and 4.

**Acupuncture:** In an uncontrolled clinical trial (level 4), electroacupuncture was given to 17 patients with chronic neuropathic pain that was resistant to pain therapy (Irnich, Winklmeier, Beyer, & Peter, 2002). Patients were treated twice weekly for a period of four weeks. Reevaluation two weeks after the conclusion of treatment revealed that mean continuous pain was reduced by 33% and the intensity of pain attacks was reduced by 59%. At three months post-treatment, continuous pain still was reduced, but at a lower rate (16%). The intensity of pain attacks continued to decrease to 44% at three months post-treatment.

A randomized, blinded clinical trial (level 2) by Alimi et al. (2003) examined the efficacy of auricular acupuncture in decreasing pain intensity among 90 patients with cancer. In comparison to the placebo group, neurologic pain intensity decreased by 36% at two months from baseline in the group receiving acupuncture. The observed reduction in pain intensity represents a clear benefit from auricular acupuncture for those patients experiencing neurologic pain symptoms.

In a prospective pilot series (level 4) conducted by Wong and Sagar (2006), two courses of acupuncture were performed on five patients with platinum- and taxane-induced peripheral neuropathy. At the end of the therapy, all five patients reported improvement in pain, numbness, and tingling, with a reduction in analgesic dosage. At a six-month follow-up, symptom control persisted in four of the patients. Although the study sample was very small, the responses to treatment are encouraging. However, Pittler and Ernst (2008) conducted a review of the available literature related to CTs and neuropathic or neuralgic pain and found that no compelling evidence existed for the use of acupuncture in relieving neuropathic or neuralgic pain.

**Summary:** Additional trials with more participants are needed to make a definitive conclusion on the effectiveness of acupuncture, massage therapy, and therapeutic touch for neuropathic pain.

**Conclusion**

As evidenced by this review of the literature, massage therapy, acupuncture, and energy therapies have demonstrated some effectiveness in decreasing cancer pain and adverse symptoms related to treatment and diagnosis. Although CTs may help reduce pain and adverse symptoms in those with newly diagnosed or advanced disease, they should not be relied on for total pain control. Use of CTs and Western medicine as an integrative approach to cancer pain and symptom management may prove to be more beneficial than pharmacologic treatment alone. Oncology nurses are in an opportune position to educate about and facilitate the use of complementary interventions to promote comfort and relief among patients.

**The authors gratefully acknowledge Katherine Kipp, MS, RN, APN, Michele Stewart, RD, RN, and Rhonna Clary, BS, RN, for their assistance in the development of this manuscript.**

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**References**


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